REMARKS

Applicants have amended their claims in order to further clarify the definition of various aspects of the present invention. Specifically, Applicants have incorporated the subject matter of claim 4 (that is, the dielectric constant of the amide solvent) into claim 1; and, correspondingly, have cancelled claim 4 without prejudice or disclaimer. In addition, Applicants have amended each of claims 10-12 to recite an amide "solvent" or ether "solvent", consistent with claim 1.

Moreover, Applicants are adding new claims 15 and 16 to the application. Claims 15 and 16, dependent respectively on claims 1 and 15, respectively defines content of each of the amide solvent and ether solvent in the resist stripping composition; and recites a mixing ratio of amide solvent to ether solvent in the resist stripping composition, consistent with the description in the paragraph bridging pages 3 and 4 of Applicants' specification.

Applicants respectfully submit that all of the claims presented for consideration by the Examiner patentably distinguish over the teachings of the prior art applied by the Examiner in rejecting claims in the Office Action mailed May 13, 2005, that is, the teachings of the U.S. patents to Ikemoto, et al., No. 6,372,410, to Abe, et al., No. 6,323,169, to Gotoh, et al., No. 6,265,309 (Gotoh '309), to Gotoh, et al., No. 6,514,352 (Gotoh '352), to Maruyama, et al., No. 5,962,385, to Torii, et al., No. 5,972,862, and to Tanabe, et al., No. 5,792,274, under the provisions of 35 USC 102 and 35 USC 103.

It is respectfully submitted that the references as applied by the Examiner would have neither taught nor would have suggested such a resist stripping composition as in the present claims, having the fluorine compound, and additionally having the mixed solvent including, inter alia, the amide solvent and the ether

solvent, wherein the amide solvent has a dielectric constant of 25 or more. See claim 1.

As described in the paragraph bridging pages 3 and 4 of Applicants' specification, an amide solvent having a dielectric constant of 25 or more is high in resist stripping ability; while the amide solvent is highly corrosive to low-k materials and has a low solubility to the fluorine compounds, the ether solvent (though somewhat inferior to the amide solvent in its resist stripping ability) is high in solubility to the fluorine compound and less corrosive to low-k materials. By using the mixed solvent of, inter alia, the amide solvent and ether solvent, as in the present claims, with the amide solvent of this mixed solvent having a dielectric constant of 25 or more, only the beneficial effects of the amide solvent and the ether solvent are utilized by the combined use thereof. See especially page 3, lines 19-26, of Applicants' specification.

As will be shown in the following, and from a review of the evidence in Applicants' specification, it is respectfully submitted that through use of the mixed solvent as in the present claims, the mixed solvent including the amide solvent having the specified dielectric constant, unexpectedly better results are achieved as compared with, for example, results achieved by resist stripping compositions/cleaning liquids previously proposed.

Moreover, it is respectfully submitted the teachings of the applied prior art would have neither disclosed nor would have suggested the other features of the present invention as in the dependent claims in the application, having features as discussed previously in connection with claim 1, and, in addition, wherein the fluorine compound, ether solvent and amide solvent are those set forth in, e.g., claims 2, 3, 5, 6 and 9-12; and/or wherein the resist stripping composition additionally includes a

corrosion inhibitor as in claims 7 and 8; and/or amounts of the various components as in claims 13-16.

The present invention is directed to a resist stripping composition, for use in production of, e.g., semiconductor devices and liquid crystal devices.

In forming semiconductor and liquid crystal panel devices, patterning of a photoresist and dry etching using the patterned photoresist as a mask have been used; thereafter, the photoresist is ashed and remaining resist residue is removed from the inorganic substrate.

Recently, aqueous solutions containing a fluorine compound, an amide, dimethylsulfoxide and a corrosion inhibitor have been proposed as a resist stripping composition, because of a high removal ability of resist residue and ease of use. However, such proposed stripping compositions are strongly corrosive to low-k materials used as low-k dielectric films. Accordingly, it is desired to provide a resist stripping composition which is effective in stripping resist at low temperatures in a short period of time, and with minimized corrosion of, e.g., metal wiring and low-k dielectric films.

Against this background, Applicants provide a resist stripping composition wherein resist residue remaining after dry-etching or after the ashing process can be easily and effectively removed without corrosion of underlying materials, including wiring materials and low-k materials. That is, the resist residue can be removed at low temperatures in a short period of time, with minimal corrosion. Applicants have found that by including a mixed solvent of an amide and ether in the stripping composition, objectives according to the present invention are achieved. In particular, by utilizing an amide solvent having a dielectric constant of at least 25, together with the ether in the mixed solvent, effective resist stripping is achieved,

with minimized corrosion; and, moreover, the fluorine compounds are highly soluble in the mixed solvent. Note, in particular, the paragraph bridging pages 3 and 4 of Applicants' specification.

Attention is respectfully directed to the Examples and Comparative Examples on pages 7-10 of Applicants' specification. Note, in particular, Comparative Examples 1 and 3, respectively including an ether as the solvent and an amide as the solvent, together with water. Using the ether as a solvent, it is seen that the resist residues were not removed; using the amide as the solvent, while the resist residues were removed there was a high corrosion tendency to the low dielectric film. As seen in Table 1 on pages 7-9 of Applicants' specification, by using a mixture of amide and ether solvents, according to the present invention, resist residues were removed with no aluminum corrosion, and with a relatively small etching rate of the low-k materials.

It is respectfully submitted that this evidence in Applicants' specification must considered in determining patentability, since, as shown infra, the teachings of the applied references would not have anticipated the presently claimed subject matter. See In re DeBlauwe, 222 USPQ 191 (CAFC 1984). Properly considering the evidence of record, it is respectfully submitted that this evidence clearly supports patentability of the presently claimed subject matter.

With respect to evidence in Applicants' specification, note that the Comparative Examples in Applicants' specification are examples of U.S. Patent No. 5,962,285 to Maruyama, et al. Clearly, this evidence verifies superiority over one of the cited prior art references.

Ikemoto, et al. discloses a resist stripping composition, for removing resist residues remaining after etching or ashing, the composition including specified

amounts of a fluorine compound and of an ether solvent, the balance being substantially water. See column 2, lines 22-25. Note also column 3, lines 51-60.

It is respectfully submitted that Ikemoto, et al. does not disclose, nor would have suggested, a resist stripping composition as in the present claims, including the mixed solvent of amide and ether solvents, much less the unexpectedly better results achieved thereby; and, not disclosing an amide solvent, would have neither disclosed nor would have suggested the dielectric constant of the amide solvent as in all of the present claims.

Abe, et al. discloses a resist stripping composition wherein, in a second aspect thereof, the composition includes an oxidizing agent, a chelating agent, a water-soluble fluorine compound and an organic solvent. See column 2, lines 36-39. As for the oxidizing and chelating agents, note column 2, lines 52-67. As for the water-soluble fluorine compounds, note column 3, lines 38-41. This patent discloses that the organic solvents may include ether solvents, a number thereof being named; amide solvent, a number thereof being named; and sulfur compound solvents, a number thereof being named. See column 3, lines 46-63. This patent goes on to disclose that the organic solvents may be used alone or in combination of two or more. See column 4, lines 1 and 2. Note also column 4, lines 9-12 and 16-19.

It is respectfully submitted that Abe, et al. would have neither taught nor would have suggested a composition as in the present claims including, inter alia, the amide solvent having the recited dielectric constant, and advantages thereof; and/or the unexpectedly better results achieved through using a mixed solvent of amide and ether solvents, as in the present invention.

In connection with the other applied prior art, Gotoh '309 discloses a cleaning agent which can effectively remove polymeric deposits adhering inside and around a

via hole and on the side wall of a conductive line pattern, formed during dry etching. The cleaning agent is disclosed, for example, in column 3, lines 40-44 and 45-58. See also column 5, lines 30-43 and column 8, lines 38-46, of Gotoh '309.

Gotoh '352 discloses a cleaning method for removing deposits adhering firmly to a surface of a material to be treated, without damaging the material to be treated, the method being disclosed most generally in column 3, lines 4-10 of this patent. Specifically, this patent discloses that a cleaning agent including an oxidizing agent, a chelating agent and a fluorine compound is allowed to flow on the surface of the material to be treated at a high speed. Note also column 4, lines 51-57 for the fluorine compound used in the cleaning agent caused to flow at the high speed. Note also the paragraph bridging columns 4 and 5 of Gotoh '352, for an organic solvent used in the cleaning agent.

Maruyama, et al. discloses a cleaning liquid, used, for example, for removal of resist residues left remaining after dry etching, the cleaning liquid including specified amounts of a fluorine compound, an organic solvent soluble in water, and water. See column 2, lines 25-28. Note also the paragraph bridging columns 2 and 3, describing examples of the organic solvent.

Torii, et al. discloses a cleaning liquid having extremely low corrosiveness to materials such as a metallic film and SOG (Spin-on-glass) films, the cleaning liquid being suitably used for, e.g., removing a deposit polymer formed in the case of dry etching in a semiconductor device production process. The cleaning liquid is described, in various embodiments, in column 3, lines 22-55, and includes a fluorine-containing compound, a water-soluble or water-miscible organic solvent, and an inorganic acid or organic acid, in each of the various embodiments. The fluorine-containing compound is described, e.g., in column 4, lines 46-50; and the organic

solvent is described in the paragraph bridging columns 4 and 5, and the first full paragraph in column 5, of the patent. This patent discloses, e.g., that the organic solvent maybe used alone or in combination with at least one other.

Tanabe, et al. discloses a remover solution composition for resists, advantageously used in the production of semiconductor elements, having high removing performance at a low temperature, which does not corrode electroconductive metal films, is highly safe and can be easily handled. The remover solution composition is described most generally in column 2, lines 59-65, and includes, e.g., a salt of hydrofluoric acid with a metal-free base, a water-soluble organic solvent and water, and optionally containing an anticorrosive, the composition having a hydrogen ion concentration (pH) of 5-8. Note also column 4, lines 5-43 for water-soluble organic solvents which can be used. Note that this patent specifically discloses a mixture of specified amounts of ethylene glycol and dimethyl sulfoxide as the solvent; see column 4, lines 38-43.

As can be seen on the foregoing, as well as a full review of each of the applied references, it is respectfully submitted that these references do not disclose, nor would have suggested, a resist stripping composition wherein the amide solvent of the mixed solvent thereof has a dielectric constant of 25 or more and advantages thereof as discussed in the foregoing.

Moreover, it is emphasized that various of the references have general disclosures concerning the solvents of the described compositions, and include a disclosure that a combination of the solvents may be used. It is respectfully submitted that such general disclosure does not provide sufficient specific guidance, and would have neither taught nor would have suggested the composition including the mixed solvent of amide and ether solvents as in all of the present claims, much

less unexpectedly better results achieved through use of the mixed solvent as discussed in the foregoing, such unexpectedly better results being shown by the evidence in Applicants' specification, including comparative evidence with the closest prior art (note the foregoing discussion with respect to Comparative Examples in the present application corresponding to Maruyama, et al.).

In the comments by the Examiner concerning each of the applied references, in the Office Action mailed May 13, 2005, the Examiner does not address the dielectric constant of the amide solvent, notwithstanding that such dielectric constant was recited in previously considered claim 4. It is respectfully submitted that the Examiner has not established a prima facie case of obviousness, including, inter alia, wherein the amide solvent of the resist stripping composition has the recited dielectric constant.

In view of the foregoing comments and amendments, reconsideration and allowance of all claims presently pending in the application are respectfully requested.

Applicants request any shortage of fees due in connection with the filing of this paper be charged to the Deposit Account of Antonelli, Terry, Stout & Kraus, LLP,

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Deposit Account No. 01-2135 (case 396.42871X00), and credit any excess payment of fees to such Deposit Account.

Respectfully submitted,

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